

REMARKS

Applicants respectfully request reconsideration of the present application in view of the following remarks.

I. Status of the Claims

Claims 27 and 29 are currently pending in the application. Claim 27 is amended to correct a typographical error and clarify that the 5' flanking region of the gymnosperm loblolly pine 4CL1B is shown in SEQ ID No: 11. Claim 29 is amended to specify that the promoter region directs gene expression and includes two GGTAGGTA binding sites. Support for the amendments to claims 27 and 29 may be found, *inter alia*, at page 2, lines 13-15, and in SEQ ID NO: 11 in the specification as originally filed.

Claims 1-26, 28 and 30-45 were previously cancelled without prejudice to or disclaimer of the subject matter therein.

As the foregoing amendments do not introduce any new matter into the application, their entry is respectfully requested.

II. The Rejections Under 35 U.S.C. § 112, First Paragraph

A. Written Description

The Office Action, at pages 2-3, rejects claim 29 under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The Office Action states that Applicants do not disclose a representative number of promoter sequences from gymnosperm 4CL genes and fail to disclose a structure/function relationship for the 4CL promoters. According to the Office Action, Applicants do not disclose if all gymnosperm 4CL promoters have the same expression profile. Applicants respectfully traverse the rejection.

Solely to advance prosecution, and not in acquiescence with the rejection, Applicants have amended claim 29 to specify that the promoter region directs gene expression and includes two GGTAGGTA binding sites.

The description in the present application provides extensive disclosure of the 4CL1B promoter, which corresponds to SEQ ID NO: 11. Specifically, the 4CL1B promoter is described in Example 5 as being 2.3 kb in size. SEQ ID NO: 11 has two possible CCAAT-like motifs (at positions 2018–2021 and 2014–2044) and two possible TATA motifs (positions 2037–2040 and 2066–2069) upstream of the 5'-untranslated region. Furthermore, SEQ ID NO: 11 includes two GGTAGGTA motifs, with one beginning at position 1802. These motifs are predicted to be MYB binding sites involved in promoter specificity (See Goicoechea *et al.*, *The Plant Journal* 43: 553-567 (2005), attached herewith as Exhibit C). These data confirm that the sequence claimed in the present application comprises the necessary elements essential for promoter binding and activity. Applicants submit herewith a declaration by Dr. William Rottmann, an expert in the field of plant genetics, stating the structural/functional features of the claimed 4CL promoter.

In addition, Applicants submit herewith, attached as Exhibit B, the alignment of the 4CL1B promoter, represented by SEQ ID NO: 11, and the *Pinus radiata* 4CL promoter. The aligned sequences show great similarity in several regions and are over 95% identical in the segments corresponding to bases 630-1254 and 1404-2221 regions of SEQ ID NO: 11. These data further confirm that the claimed sequence has the structural and functional features of a 4CL promoter.

Accordingly, the promoter sequence claimed in the present application is adequately described in the specification and the written description rejection is improper. Reconsideration and withdrawal of this ground of rejection are therefore respectfully requested.

B. Enablement

The Office Action, at pages 3-4, rejects claims 27 and 29 under 35 U.S.C. § 112, first paragraph, as allegedly containing subject matter which was not described in the specification in such a way to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Specifically, the Office Action states that Applicants have not disclosed if SEQ ID NO: 10 comprises the necessary elements essential for promoter activity, and whether the isolated promoter has any promoter activity at all. Applicants respectfully traverse the rejection.

Solely to advance prosecution, and not in acquiescence with the rejection, Applicants have amended claim 27 to correct a typographical error and clarify that the 5' flanking region of the gymnosperm loblolly pine 4CL1B is shown in SEQ ID No: 11. In addition, claim 29 is amended to specify that the promoter region directs gene expression and includes two GGTAGGTA binding sites.

As stated above, the promoter activity of the 4CL1B promoter, represented by SEQ ID NO: 11, is demonstrated by the close correlation with the *Pinus radiata* 4CL promoter, the GUS expression of which is similar in pattern to the GUS expression of the 4CL1B promoter. Furthermore, the publication by Goicoechea *et al.* (*The Plant Journal* 43: 553-567 (2005)), attached as Exhibit B, shows that the MYB2 transcription factor isolated from *Eucalyptus gunnii* specifically binds to cis-regulatory regions in two lignin biosynthetic genes through a G(G/T)T(A/T)GGT(A/G) binding site. As stated above, and in the declaration attached herewith, the sequences claimed in the present application include the two GGTAGGTA motifs predicted to be MYB binding sites involved in promoter specificity according to Goicoechea *et al.*, thus confirming that they comprise the necessary elements essential for promoter binding and activity.

Clearly, the specification provides extensive information to enable the person skilled in the art to make and/or use the invention claimed in the present application. The person of skill in the art, reading the specification, can readily identify the sequences described in the

claims and make the sequences using techniques provided in the specification or known to one of skill in the art. The sequences can then be tested using the procedures outlined in the specification and enabling for the many different experimental procedures described in the application. Thus, the claimed invention is fully enabled. Withdrawal of the rejection is therefore respectfully requested.

III. The Rejection Under 35 U.S.C. § 102(b)

The Office Action, at page 4, rejects claim 29 under 35 U.S.C. § 102(b) as allegedly being anticipated by Voo *et al.* (*Plant Physiol.* 108: 85-97 (1995)) (“Voo”). The Office Action states that Voo discloses a promoter sequence 5’ to the ATG from a 4CL gene isolated from loblolly pine, comprising 142 base pairs that exhibit 100% sequence identity to bases 515 to 656 of SEQ ID NO: 10. Applicants respectfully traverse the rejection.

Claim 29, as amended, is directed to an isolate DNA that comprises the promoter region of the gymnosperm 4CL gene involved in syringyl lignin biosynthesis, wherein the promoter region directs gene expression and includes two GGTAGGTA binding sites..

As stated in the Declaration attached herewith, the cDNA sequence provided by Voo does not specify sequences sufficient for gene expression. In fact, the CCAAT and TATA Box motifs, found upstream of the transcribed region, are missing from the cDNA sequence disclosed in Voo.

The promoter region claimed in the present application directs gene expression. In order for a promoter to direct gene expression, the promoter region must have a CCAAT-like motif and a TATA Box motif. As stated above, the 4CL1B promoter represented by SEQ ID NO: 11 has two possible CCAAT-like motifs (at positions 2018–2021 and 2014–2044) and two possible TATA motifs (at positions 2037–2040 and 2066–2069) upstream of the 5’-untranslated region. The 142 base pair sequence disclosed by Voo lacks these motifs, and therefore is **neither sufficient nor essential** for promoter activity and gene expression.

At least for the reasons stated above, the prior art fails to teach or suggest the claimed invention. Reconsideration and withdrawal of this ground of rejection are therefore respectfully requested.

CONCLUSION

All of the stated grounds of rejections have been properly traversed or rendered moot. Therefore, the present application is now in condition for allowance, and an early notice to that effect is earnestly solicited.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5483
Facsimile: (202) 672-5399

By Richard C. Peet

Richard C. Peet
Attorney for Applicants
Registration No. 35,792